

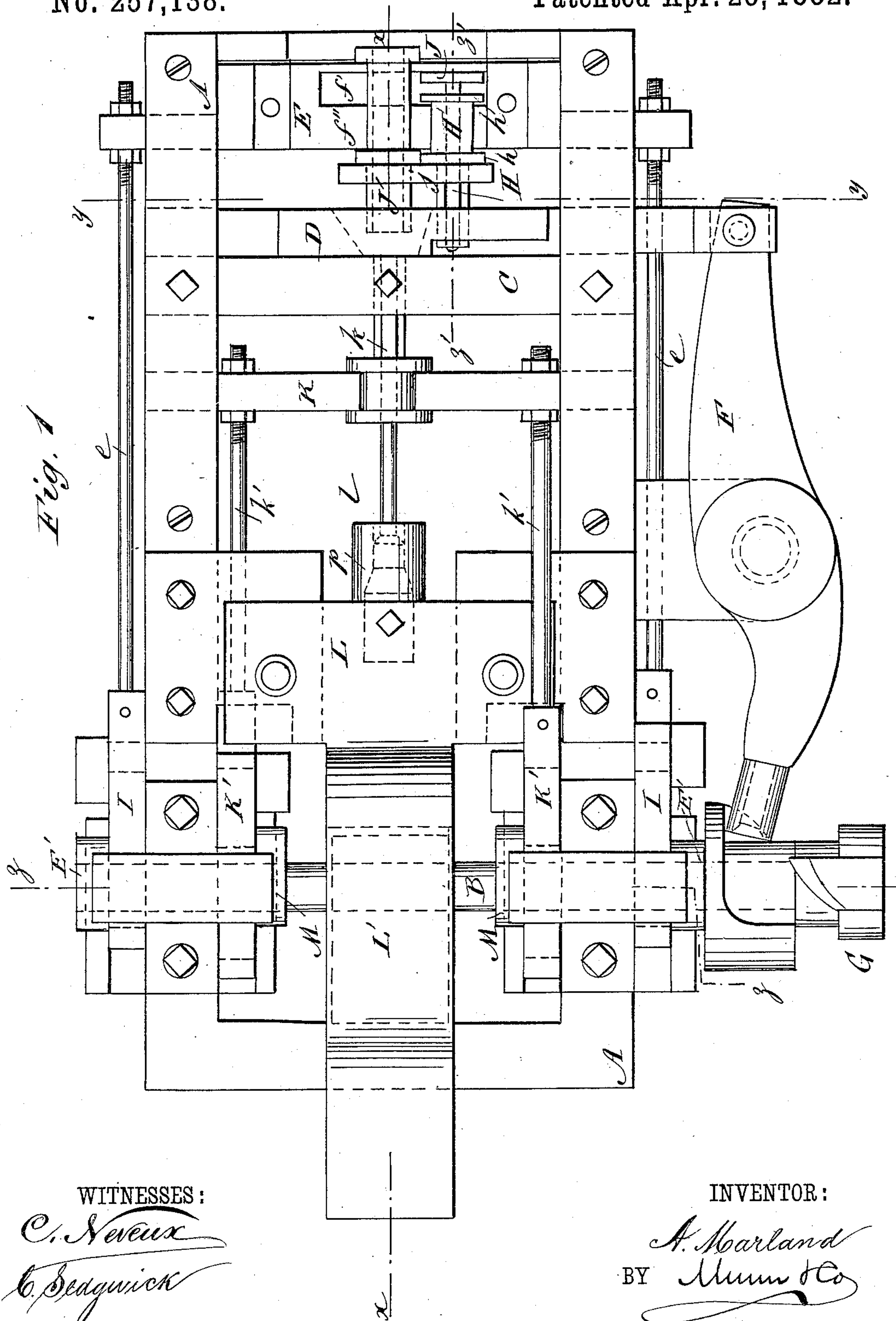
(No Model.)

3 Sheets—Sheet 1.

A. MARLAND.
NUT MACHINE.

No. 257,138.

Patented Apr. 25, 1882.



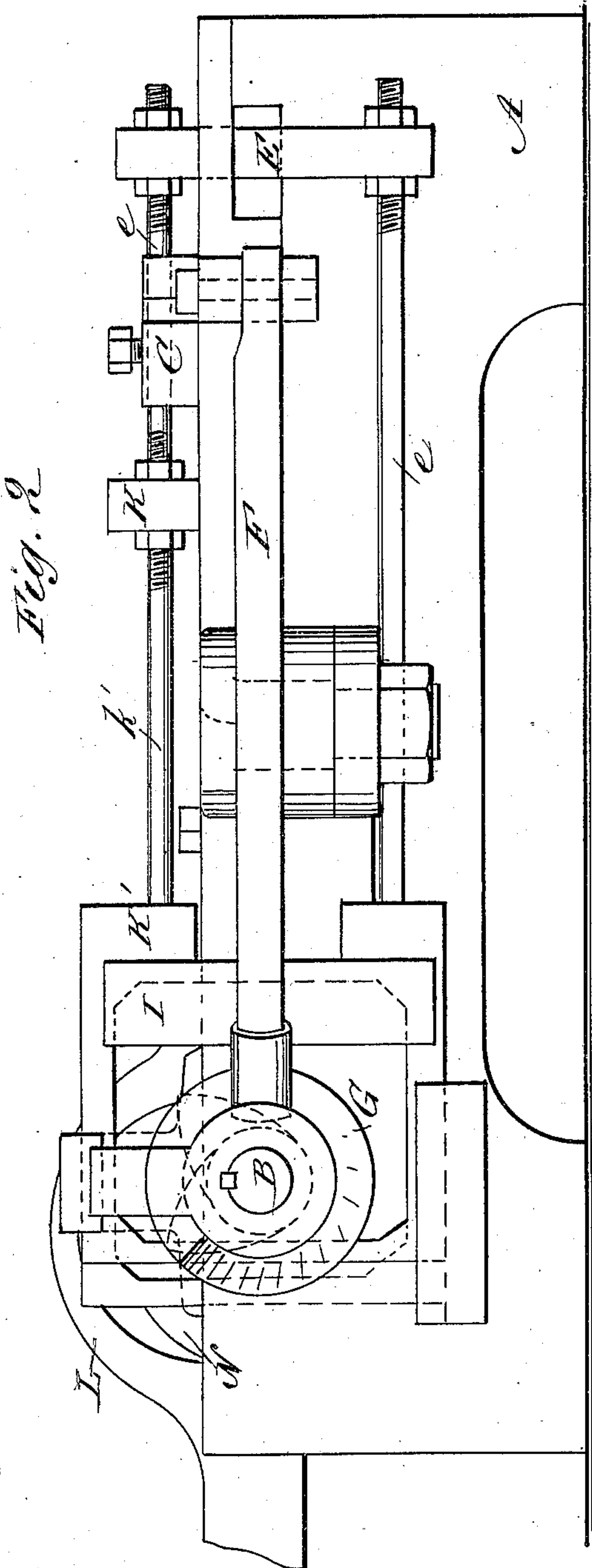
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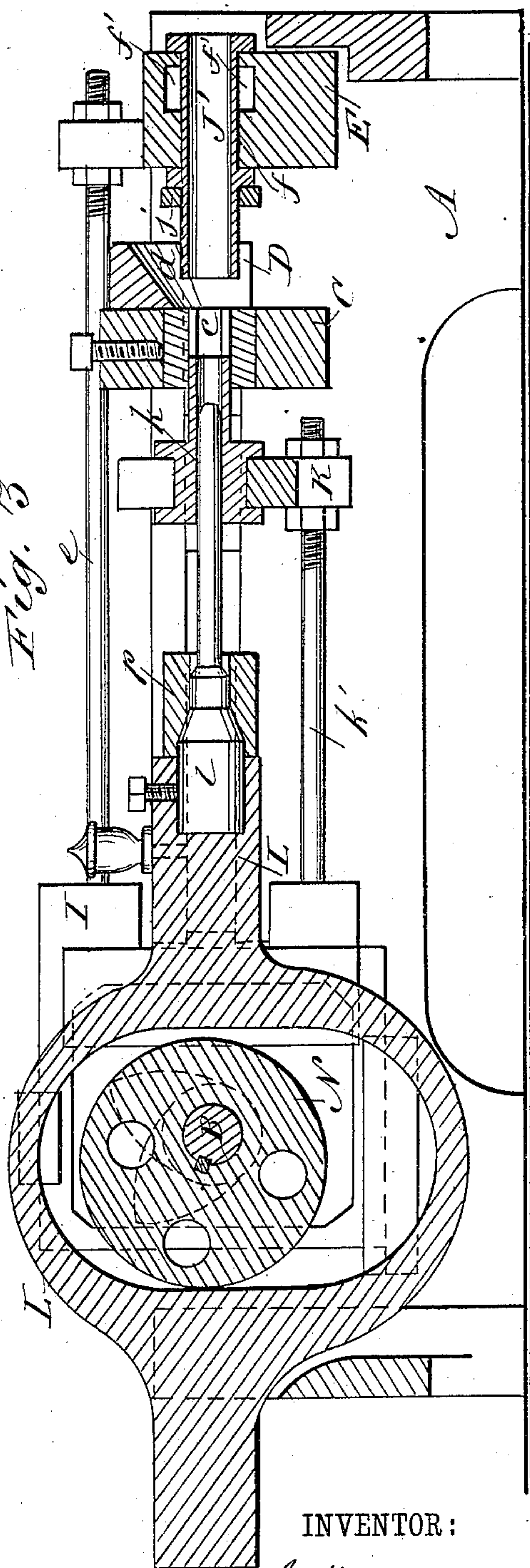
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WITNESSES:
C. Neveu
C. Pedgum



INVENTOR:
A. Marland
BY *Mum & Co*
ATTORNEYS.

(No Model.)

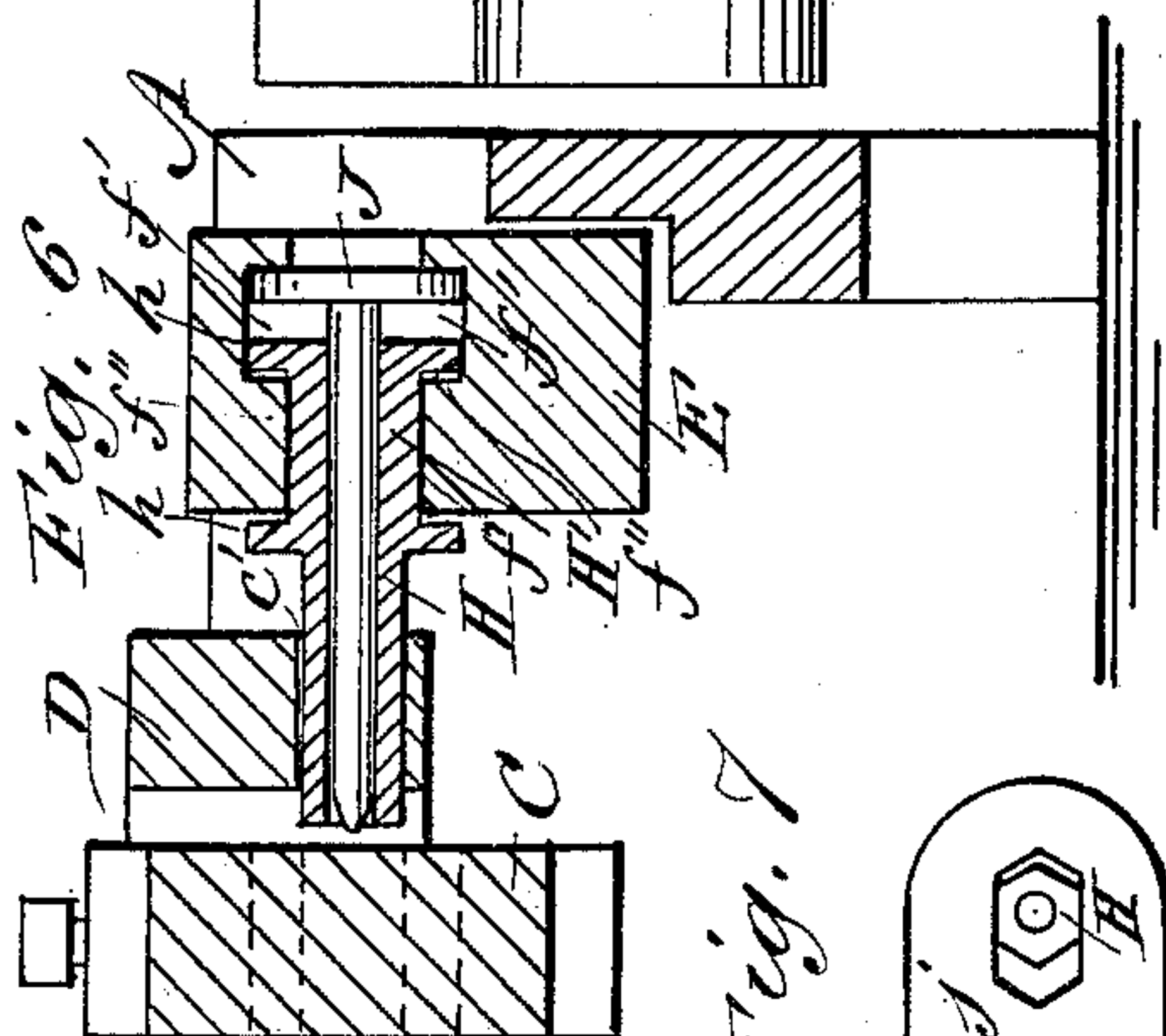
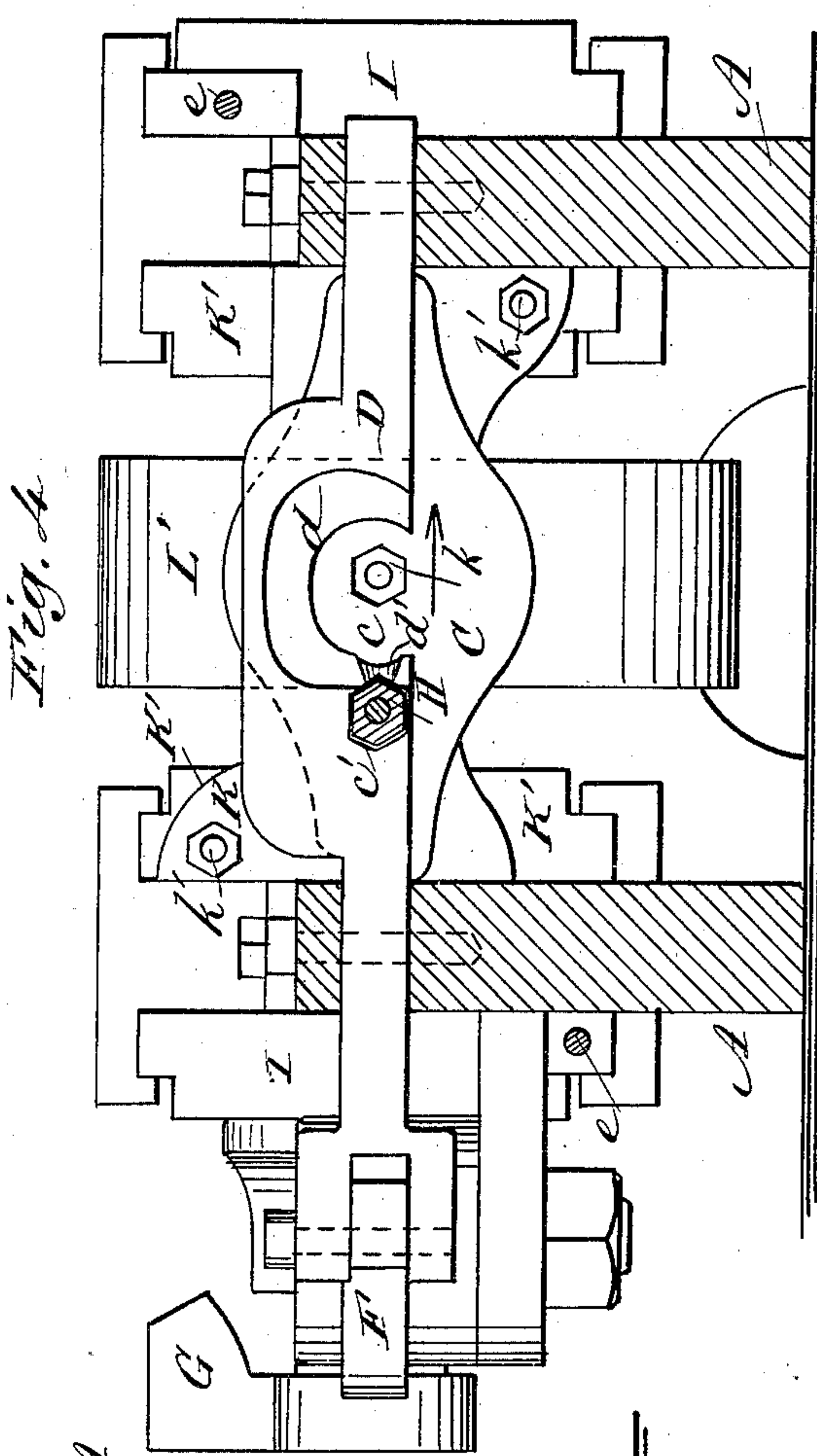
3 Sheets—Sheet 3.

A. MARLAND.

NUT MACHINE.

No. 257,138.

Patented Apr. 25, 1882.



WITNESSES:
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C. Sedgwick

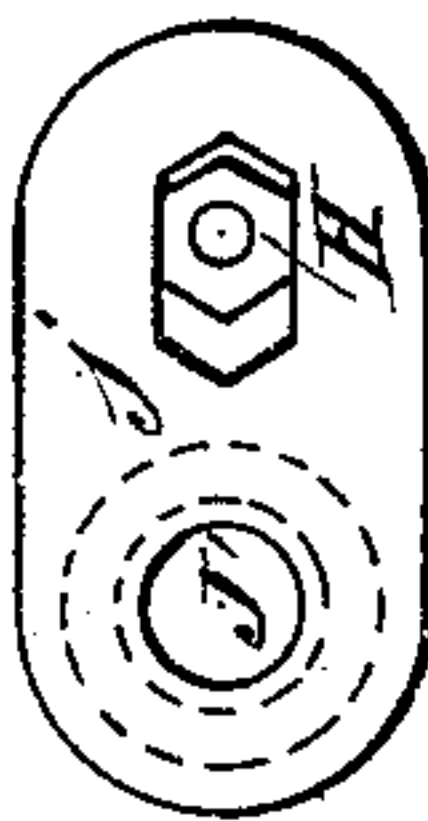


Fig. 8

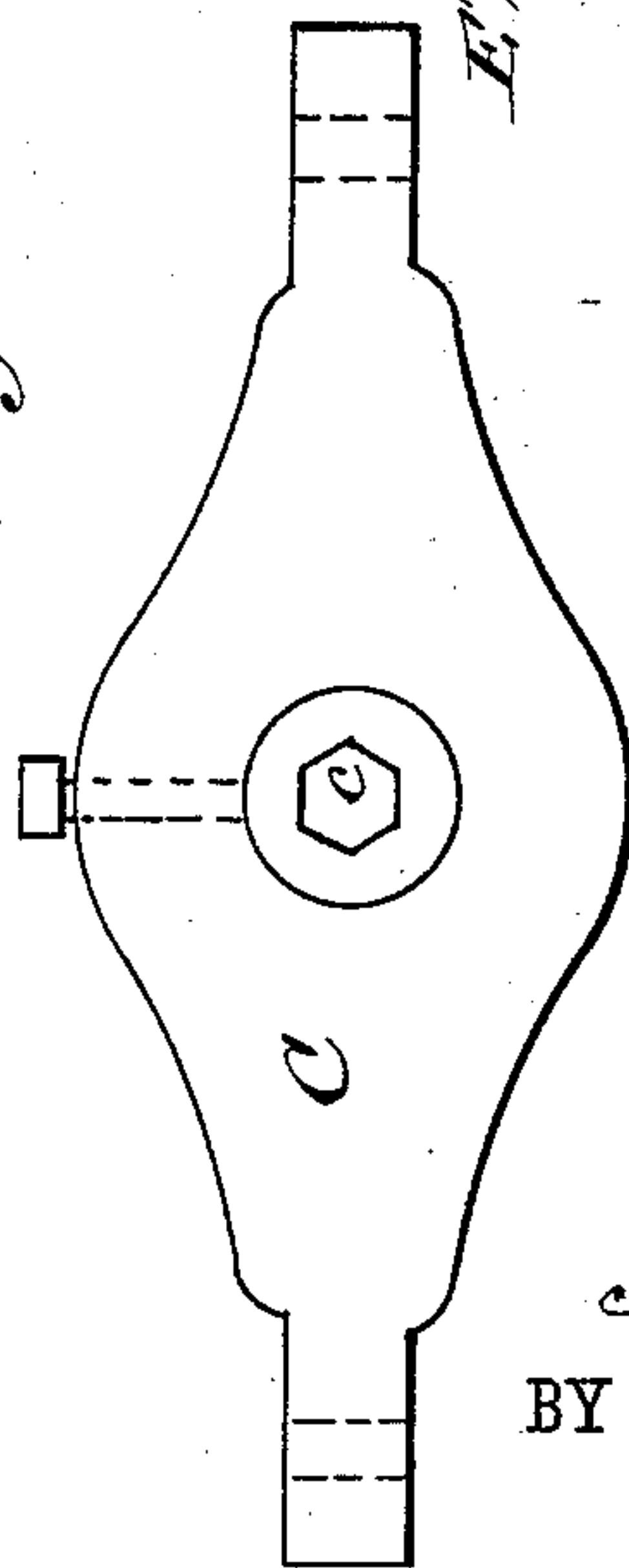
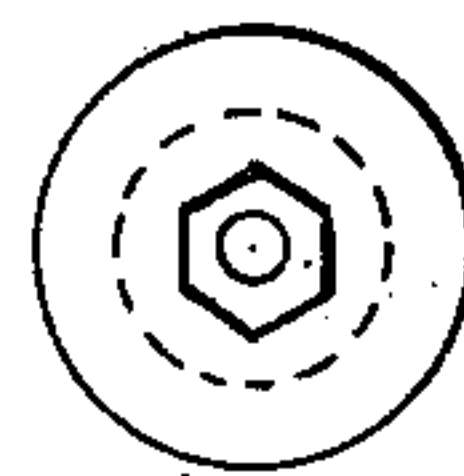


Fig. 9



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UNITED STATES PATENT OFFICE.

ALFRED MARLAND, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO HIMSELF AND THOMAS NEELY, OF SAME PLACE.

NUT-MACHINE.

SPECIFICATION forming part of Letters Patent No. 257,138, dated April 25, 1882.

Application filed August 12, 1881. (No model.)

To all whom it may concern:

Be it known that I, ALFRED MARLAND, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Nut-Machines, of which the following is a full, clear, and exact specification.

This invention relates to nut-machines of the class shown and described in Letters Patent No. 172,272, which were granted to me January 18, 1876, which machines are adapted to cut the blanks of proper length from a bar or rod and compress them in a suitable forming-die, and at the same time axially punch the blanks in the line of the length of the bar or rod from which they are cut and transversely to the plane of the cut, and then automatically discharge the completed product from the forming-die.

My present improved machine is composed of a forming-die and four principal tool-carrying parts—viz., two cross-heads carrying hollow compressing-mandrels, (through which mandrels the punches are adapted to move,) a cross-head carrying the main punch, and the transversely-moving knife—all of which are preferably operated through connecting rods, yokes, and levers from suitably constructed and arranged cams upon a single main driving-shaft.

The invention consists of giving to these parts of the machine certain individual and relative movements, whereby the nuts are more perfectly formed and the machine rendered more efficient for its purpose than heretofore.

The invention also consists of the details of construction and of the combinations and arrangements of the parts, all as hereinafter more fully described.

In the accompanying drawings, Figure 1 is a plan view of my improved nut-machine. Fig. 2 is a side elevation thereof. Fig. 3 is a central longitudinal sectional elevation taken on the line xx of Fig. 1. Fig. 4 is a cross-sectional elevation taken on the line yy of Fig. 1. Fig. 5 is a cross-sectional elevation taken on the line zz of Fig. 1. Fig. 6 is a sectional elevation on the line $z'z'$ of Fig. 1; and Figs. 7, 8, and 9 are detail views, showing respectively

an end elevation of the auxiliary mandrel and punch and feeding-tube yoked together, a side elevation of the forming-die, and an end view of the main mandrel and punch, all removed from the machine.

Similar letters of reference indicate corresponding parts.

The frame-work A may be of any suitable construction for carrying the moving parts of the machine. In and near one end of the frame-work is journaled the main shaft B, and upon the frame-work, and near the other end thereof, is secured the die-block C, in which is placed the forming-die c , in which the blanks are compressed, shaped, and punched. Between the die-block C and the front end of the frame-work—that is, the end opposite to the one in which the main shaft is journaled—is placed the cutting bar or knife D and the sliding cross-head E.

The cutting-bar is formed with the large opening or cut-away place d , and in one side of this opening is formed the cutting or knife edge d' , which is in line with the forming-die c , as shown in Fig. 4, and the knife is given a transverse movement against the front face of the die-block C by means of the pivoted lever F, which is moved by the cam G, fixed upon the end of the main shaft.

In the cutting-bar is also formed, in line with the die c , the opening c' , in which the hollow auxiliary mandrel H is placed. This mandrel is given a backward and forward movement by means of the cross-head E, which cross-head is reciprocated by the cams E' upon the main shaft moving in the yokes I I, which are connected to the ends of the cross-head by the connecting-rods $e e$. Besides the reciprocating movement which the cross-head E gives to the mandrel H, the same is given a lateral movement by the cutting-bar, the mandrel being placed and held in the opening c' thereof. In order to accommodate this lateral movement and at the same time to connect the mandrel to the cross-head, so that the movement of the cross-head will be communicated to the mandrel, the cross-head is formed with the elongated opening f , and the top and bottom of said opening with the elongated gutters $f'f'$,

and the head H' of the mandrel is formed with the collars h h , which fit upon the ways f'' f'' , formed by said gutters, as shown in Fig. 6.

In the hollow mandrel H is placed the headed punch J , which is moved through the mandrel, for the purposes hereinafter described, and in the elongated opening in the cross-head is placed the collared feed-tube J' , which is yoked to the mandrel H by the yoke j , and is thus moved laterally with the mandrel, so as to register at the proper time with the die c for feeding the rod or bar of iron to the machine.

Between the die-block C and the main shaft B is placed the cross-head K , which carries the main hollow mandrel k , and the cross-head L , which carries the main punch l , which latter moves through the said main mandrel. The cross-head K is given a reciprocating motion by means of the connecting-rods k' k' and the yokes $K'K'$, which fit over the cams M M upon the shaft, and the cross-head L is given a reciprocating motion by means of the yoke L' , (which is preferably made integral with the cross-head,) placed over the cam N upon the main shaft.

The cams M M , G , and $E'E'$ are constructed and arranged with respect to other parts to operate them as follows: The blank bar is passed through the feed-tube into the forming-die c and then cut transversely by the knife D . The mandrel H , with its punch J , and the mandrel k , with its punch l , are caused to enter simultaneously at opposite ends of the forming-die before the cross-head E reaches the end of its movement, but at differential speed, so that the punch l will be forced through the hollow mandrel and the two punches be made to pierce the blank from opposite directions toward the center while the mandrels compress the ends. After the punches have met in the middle of the blank the punch l follows the punch J on its withdrawal far enough to remove the intermediate fin. This punch, in conjunction with the punch J , pierces the blank, forming an axial opening through it by displacement of the metal of the blank in the line of the feed and at right angles to the plane of the cutting of the blank from the rod. At this time the two mandrels are approaching each other with great force, compressing the blank endwise, causing it to be shortened and expanded and to take the outline of the walls of the particular form of die being used. After the ends of the punches have met in the blank, in order to remove any fins or thin pieces of metal which otherwise would remain in the nut at the place of meeting, I prefer to so construct the cams M M as to cause the main punch l to follow the auxiliary punch a sufficient distance as it recedes to break out such fins or thin pieces of metal, thus making a perfect and unobstructed hole through the nut. The nut having now been cut, compressed, and punched, and the auxiliary mandrel H and punch J withdrawn from the die, in order to remove the nut from the die the main mandrel is caused to move still farther forward in the

die a sufficient distance to push the nut out of the die.

It will be understood that at the time the main mandrel is moving forward to expel the nut the knife is moved back so that the cut-away portion d thereof will come in position to permit the nut to come out of the die and fall below the machine. It will also be understood that at this time the main punch is being withdrawn from the nut and from the mandrel. The nut having now been completed and cleared from the forming-die, the main mandrel k is brought rapidly back to place, so that all of the parts are at their original position again, ready to repeat the operation.

In order that nuts of different sizes and forms may be produced by this machine, I provide interchangeable dies of different sizes and forms and interchangeable mandrels to correspond; and in order that nuts of different thicknesses may be made I provide collars to be placed upon the punch l , between the cross-heads K and L , as shown at p , of different lengths; or any similar device might be used for this purpose to cause the cross-head K to have greater or less movement for the thickness of nut desired to be made.

This machine can be used for the manufacture of boiler, tank, and other kinds of rivets, and also for making bolt-blanks. When it is desired to change the machine for making rivets and bolt-blanks it is only necessary to take out both of the punches, change the forming-die for one of cylindrical form of the proper diameter for the size of rivet or bolt-blank desired, and cut the form of head required on the auxiliary mandrel, which must be of cylindrical form, as also must be the main mandrel which regulates the length of feed and delivers the product from the die. The front part of the forming-die must be enlarged, so as to allow the head to be made of any shape and as large as desired, and the mandrel must of course be correspondingly enlarged. The main mandrel k is at no time entirely withdrawn from the forming-die, but at all times forms a stop to regulate the feed of the rod or bar, so that the blanks will always be uniform and of just the right length. By displacing the material of the blank for forming the central opening through the nut instead of punching the material out a great saving of material is gained. Besides, this method facilitates the conformation of the exterior of the blank to the walls of the die; but the punch J may be dispensed with, if it is desired to punch the metal out of the blank instead of forming the opening by displacing the metal.

In making nuts or bolts of large size two knives operating from different sides of the machine may be used for severing the blanks from the rod or bar.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with the stationary forming-die c , of the knife-bar D , punches J l , and

hollow mandrels H *k*, arranged and operating together as described.

2. The combination, with the knife D, provided with the openings *c' d* and cutting-edge 5 *d'*, the lever F, and cam G, of the mandrel H, the cross-head E, rods *e e*, yokes I I, and cams E' E', as and for the purpose specified.

3. The cross-head E, provided with the opening *f*, gutters *f' f'*, and ways *f² f²*, in combination with the collared feed-tube J' and the 10 mandrel H, having head H' and collars *h h*,

said tube and mandrel being yoked together, for the purpose specified.

4. The combination, with the cross-head K, carrying hollow mandrel *k*, and the cross-head 15 L, carrying punch *l*, of the connecting-rods *k'*, yokes K' L', and cams M N, as and for the purpose specified.

ALFRED MARLAND.

Witnesses:

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JOHN C. SHUMAKER.